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CENTRAL WIRE BRACING FOR FRUIT TREES

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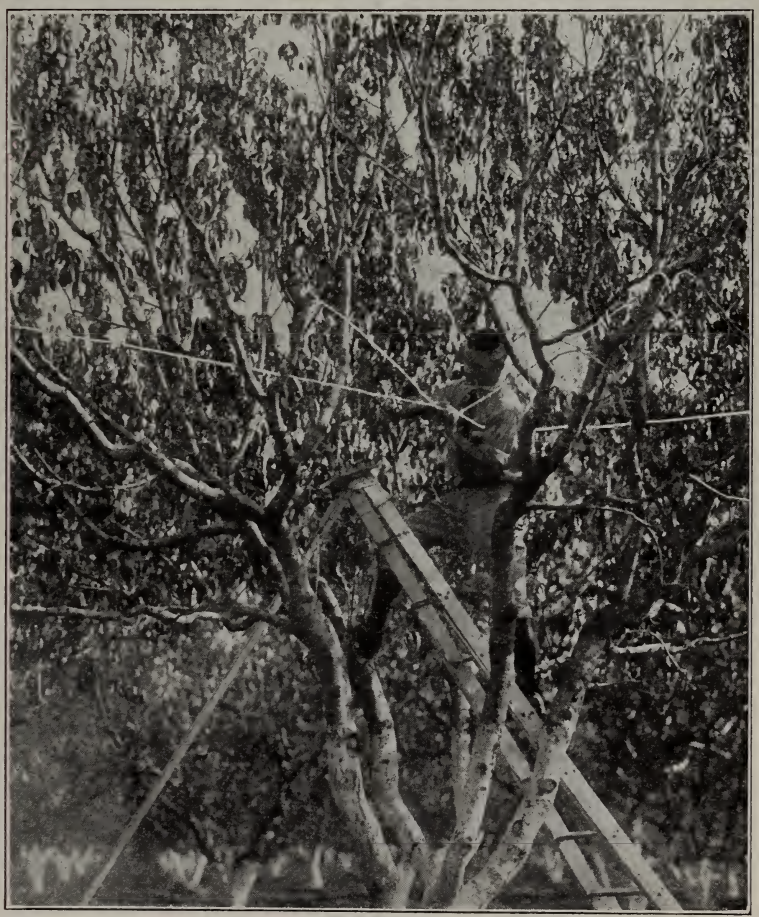
During the past few years the Agricultural Experiment Station has tested the use of wire braces as a substitute for wooden props to support the limbs of fruit trees. The efficiency of wire braces and the methods of applying them have been studied in the Experiment



Bracing fruit trees by means of wiring, Experimental Orchard, University Farm, Davis, California. (Frontispiece.)

Station orchards and also in a number of commercial orchards, in coöperation with leading fruit growers. Wire braces have proved so satisfactory that they have aroused widespread inquiry.

THE WIRE BRACE

As shown in figures 1 and 7 the tree is braced from within by means of wires. Each limb is supported by a wire, one end of which is attached to the inner side of the limb by means of a screw eye or staple. The other ends of the wires come together in the center of the tree where they are attached to a single ring at the proper height (see fig. 1).

Fig. 1.—Looking down on system of wire bracing in a prune tree. Note tautness and number of wires used, representing wooden props.

METHOD OF BRACING

In preparing to brace trees in this way approximately 150 to 200 feet of the wire should first be uncoiled along the row of trees to be wired, so as to be drawn toward the worker as he goes from tree to tree. A small branch or weight should be attached to the farther end to prevent recoiling and kinking. On the other end is made a temporary hook which is fastened to any convenient twig in reach of the worker when on the ladder. About a dozen washers or rings may be

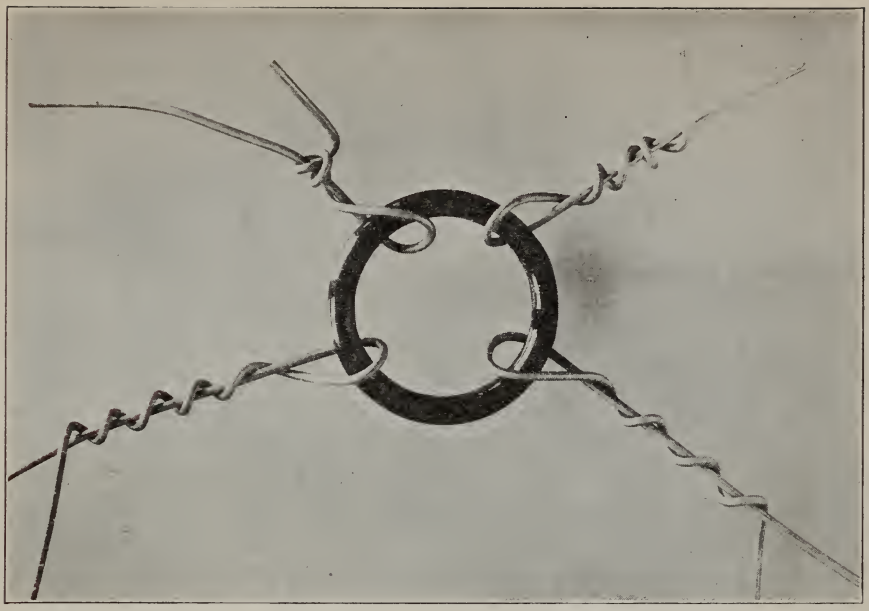


Fig. 2.—Showing wires fastened to ring in a very slipshod manner. Compare this tie with the one in figure 3 for neatness, economical use of wire, and possibilities for pulling out under a strain.

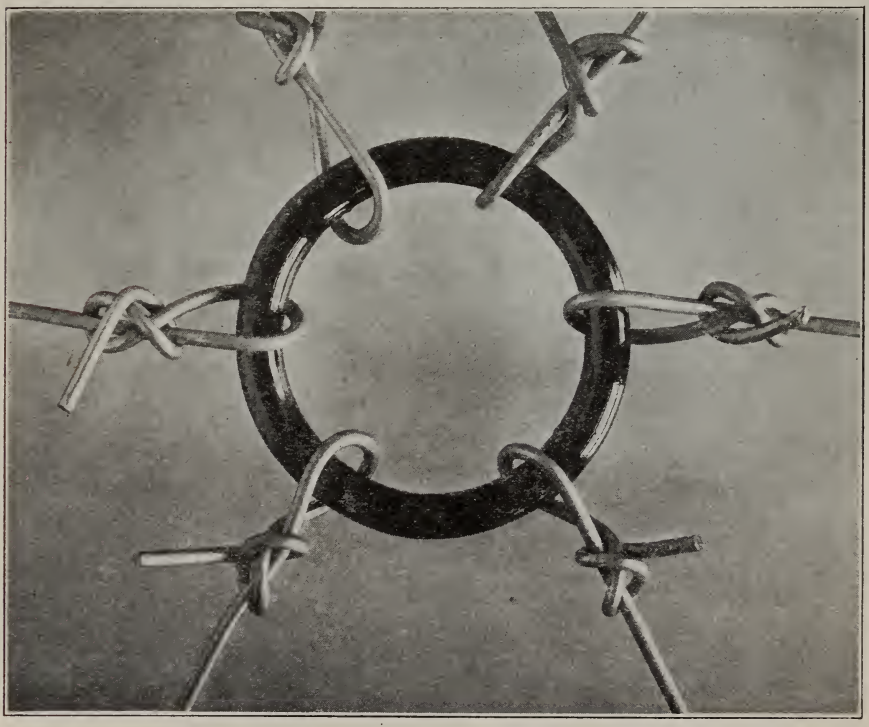


Fig. 3.—Showing japanned harness ring, also six figure eight ties, same as used on hay balers. Note neatness of tie, also economical use of wire. Will not pull out.

carried on a wire hook attached to the belt. Pliers, staples, screw eyes, hammer, and awl should be accessible for rapid work. The operator is now ready to ascend the ladder which is set in the center of the tree as shown in the frontispiece.

A screw eye or staple is inserted on the inner side of each of the four or five main limbs. The smaller branches may in turn be wired to the main limbs.

The staple or screw eye should be inserted at the proper height. If placed too low on the limb the latter may break above the support; if placed too far out on the limb there is a tendency to pull the ends of the branches in, giving the tree a bowed appearance.

An awl may be used to puncture the limb for insertion of the screw eye. The screw eye should be screwed down until its lower side just touches the bark and is left parallel to the limb rather than crosswise; if left crosswise it might cause restriction of the sap flow. This caution also applies to the position of staples when they are used.

After the screw eyes are in place, the hooked end of the uncoiled wire is inserted through one of the eyes and securely twisted to prevent slipping or pulling out. The ordinary figure eight tie, as used on hay balers, is recommended (see fig. 2). After tying, the wire is drawn toward the center and cut the desired length. From a screw eye on the opposite side of the tree the same operation of wiring is repeated. A washer, or harness ring, is next secured to the loose end of a wire that has been fastened to a screw eye. With this washer or ring in one hand the loose end of the second wire is directed through the washer or ring, pulled taut, and twisted securely. The wires should not be pulled too tight nor left too loose; they should simply take up the slack of the branches induced by gravity. The ring is now suspended in the center of the tree by the wires from opposite screw eyes and it is easy to attach the other wires.

NUMBER OF TREES WIRED PER DAY

The number of trees which may be wired in a day depends on the size of the tree and whether staples or screw eyes are used, more time being required to insert the latter. About 35 to 40 large peach trees have been wired by the writer in nine hours.

In one orchard of French prune trees, twenty to thirty years old and heavily loaded, many so large as to require a double tier of wires, only 20 to 25 trees could be wired by two men, one man working in the center of the tree and the other around the outside.

TIME OF YEAR TO WIRE TREES

If wired while the crop is on the tree, the worker cannot see well; also there is some loss of leaves and fruit. The fact that the wood is soft, however, facilitates the work with the screw eyes or staples. If wired in the fall when the leaves are off, after pruning, not only can the worker see better, but wires will not be placed on limbs which may be pruned out later. At this season the limbs are in normal position, are not weighted down with fruit, and do not need propping before securing the wire to the ring.

The time of wiring may depend upon a number of factors, like grower's time, condition of the trees, urgent necessity of support, number of props on hand for the season, cost of material, and labor available.

Fig. 4.—Showing wire leading to screw eye which has finally grown over by succeeding layers of growth.

YOUNG TREES MAY REQUIRE REWIRING LATER

Trees which are wired at an age of from four to eight years may later require additional wiring. In the case of tall trees a second tier of wires is sometimes advantageous.

ADVANTAGES OF WIRE BRACING SHOWN BY COMPARISON

Wire Bracing	Wooden Props
1. Practically permanent, lasting from 20 to 30 years.	1. Props usually last only from three to five years, and must be stored when not in use.
2. Cost of material for wiring a tree is comparatively cheap and the depreciation is very low.	2. The cost of material for propping is expensive and the depreciation high.
3. Wiring can be done at almost any season of the year.	3. Wooden props must be placed under the limbs during the fruiting season.
4. Wire bracing does not interfere with tillage and is not affected by irrigation.	4. Wooden props are a great inconvenience in cultivating and often settle or fall during irrigation, allowing limbs to break.
5. An orchard with trees centrally wired does not make an unattractive appearance.	5. An orchard with several thousand wooden props is unsightly.
6. With wire bracing the strain on any one limb is supported by all limbs, and during wind storms the braces are secure.	6. Each limb is supported separately and is allowed to whip in the wind, props being often dislodged.
7. Wire bracing does not interfere with harvesting.	7. Wooden props are inconvenient because a fruit picker must continually dodge and move his ladder around them; they are also in the way of the orchard truck.

EQUIPMENT NECESSARY AND COST OF MATERIAL

Ladders (small or large), hammer, pliers, staples or screw eyes of various sizes, $\frac{5}{8}''$ iron washers (inside diam.), $1\frac{1}{2}''$ japanned malleable iron harness rings, galvanized wire of various calibres, preferably No. 14.

Though prices may vary several times during any one year, the following quotations, obtained in November, 1921, may be of value as a basis for estimating the cost of materials used in wire bracing.

Galvanized wire No. 14 (approx. 250 lbs.)	$17.67 per coil
Screw eyes, No. 107, (large eye)	.72 per gross
Screw eyes, No. 209, (small eyes)	.72 per gross
Screw eyes, No. 108 (smaller caliper)	.75 per gross
Harness rings (japanned malleable iron), 1½″	3.25 per gross
Harness rings (japanned malleable iron), 1¼″	2.25 per gross
Harness rings (japanned malleable iron), 1″	1.40 per gross
Iron washers (inside diam. ⅝″)	.12 per lb.
Staples, ¾″ to 2″	.07 per lb.
Galvanized wire, No. 14—1 coil or 250 lbs., approx.	14,625 ft.
Iron washers, ⅝″ size	12 per lb.
Staples, ⅞″ size	416 per lb.
Staples, 1″	108 per lb.
Staples, 1¼″	87 per lb.
Staples, 1½″	72 per lb.
Staples, 1¾″	72 per lb.
Staples, 2″	58 per lb.

Fig. 5.—A heavily loaded Robe de Sargeant prune tree wire braced.

COMPARATIVE COST

Material.—Assuming that a full-bearing tree of average size requires at least eight props and that the minimum life of wire braces is 20 years, and that of the props three years, the comparative cost of propping and wiring, at current prices of materials, is as follows:

Wire Bracing

No. 14 gal. wire = 58′ per lb.

8 wires 5′ long = 40′ @ 7c per lb.	$.05
8 screw eyes @ 72c per gross	.04
1 harness ring @ $3.25 per gross	.02
Cost per tree, 20-year period	$.11

Wooden Props

8 props 1″ × 2″ × 10′ @ $40 per thou. (M) equals 13⅓ @ 4c = $ .55 per tree.

For a 20-year period the cost for wooden braces would be $3.66 per tree.

Fig. 6.—Propped Robe de Sargeant prune tree in same block as tree in fig. 5. Note number of wooden props used and the amount of space not accessible to orchard operations.

Labor.—Wooden props, for any one year, can be more quickly installed than wire braces; the labor cost for a single season would therefore be less. Over a twenty-year period, however, the cumulative cost of wooden propping would greatly exceed that of wiring, considering that the props must be hauled into and out of the orchard each year.

HELPFUL HINTS

1. For convenient work the ladder should be set up in the center of the tree. (See frontispiece.)

2. A tough leather glove worn on the hand used in twisting the wire is of considerable help.

3. It is a less serious mistake to place the wires too high than too low. If placed too low, breakage occurs above the screw eye or staple.

4. Staples can be more quickly installed than screw eyes. The ordinary barbed wire staples are best for the main limbs. Small chicken wire staples should not be used for the main limbs, as they will pull out.

5. After starting the screw eye, time can be saved by putting the point of the awl through the eye and using it as a lever to twist the screw eye into place.

6. When staples are used they should be driven in as far as possible, thus allowing the wounds to heal over sooner.

Fig. 7.—Showing wire bracing system supporting the weight of the worker. Photograph of wired peach tree in experimental orchard, Davis, California.

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